



Hooked on Smartphones: Smartphone Usage Pattern and Related Health Risks among Medical Students in a Tertiary Centre at Kolkata

Shamshad Ahmad¹, Shweta Goswami¹, Shruti Mishra², Anurag Chaudhary², Rhitam Karmakar², Dheeraj Verma²

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Author's Affiliation:

¹Assistant Professor, Dept of Community Medicine; ²MBBS Student, ESI-PGIMS & ESIC Medical College, Joka, Kilakatta

Correspondence

Dr Shweta Goswami
doc.shweta12@gmail.com

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ABSTRACT

Introduction: Globally, usage of smartphones is been increased in the recent years. Besides being beneficial gadget, it has many disadvantages like reduction in work efficiency, psychological addiction etc. The study aimed to find out the usage pattern and proportion of various risky behaviours and related health risks of Smartphone uses among medical students.

Methods: It was a descriptive cross section study. The study was conducted during May 2016. Responses were taken online through google form. WhatsApp and email platform were used for this.

Result: Smartphone usage duration was 835 hours' average per day for total sample. Use of Smartphone while driving was significantly higher among hosteller. Keep it near head, use while on charge, use while crossing road, headache, back pain, and painful fingers were significantly high in those who were using it for > 4 hours per day. 18% respondents were aware of 20-20-20 rule while using any electronic devices.

Conclusion: Smartphone was most commonly used for social networking. Using before going to sleep, keeping it near head while sleeping, using while charging or near to discharge, were most prevalent health risky behaviour. Lack of sleep, headaches, back pain, neck pain and irritation in eye were common health risks. Awareness about using smartphone in right way was very poor.

Key words: Smartphone, Health Risk, Risky behaviours, Dependency, Medical students

INTRODUCTION

Smart phones are becoming increasingly indispensable in everyday life and offer a substantial variety of mobile applications for information, communication, education, and entertainment purposes. Currently 18% of total Indian population are using Smartphone. By 2017, India is expected to overtake the US as the second largest Smartphone market.¹

Smartphone is now becoming our new external body part. This new generation device is doing

many functions beyond calling, like, surfing, gaming, watching movies, taking photos. Moving further, it is now linked to track our vital signs also. Understanding Smartphone usage patterns has been an active area of research.

There is a considerable debate on addiction and abuse to Smartphone and its consequent impact on the health. There are obvious adverse effects on physical and mental health caused by their overuse. Examples of adverse physical effects include neck pain symptoms or accidents affecting pedes-

trians and drivers while the phone is used when the user is driving. The negative aspects of Smartphone overuse on young adults, such as the disruption of social interactions, sleep deprivation and attention deficits, are being increasingly recognized recently.²

This emerging issue motivated us to analyse the usage patterns and related health risks to Smartphone overuse among medical students. Moreover, college students are considered to be vulnerable to technology overuse because of their developmental dynamics and relative independence from social roles and expectations. This study was conducted to find out the usage pattern and proportion of various risky behaviours and related health risks of Smartphone use among medical students.

METHOD

The present study was a cross-sectional study. It was conducted at ESIC Medical College, Joka during May 2016. The study population comprised of 300 undergraduate medical students of three consecutive batches. Sample size was calculated based on equation $n = N * X / (X + N - 1)$ where $X = Z_{\alpha/2} * p * (1-p) / MOE$. $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (for a confidence level of 95%, α is 0.05 and the critical value is 1.96), MOE is the margin of error, p is the sample proportion, and N is the population size. A finite Population Correction has been applied to the sample size formula. P assumed as 50%. Sample size calculated to be 169. A total of 178 students participated.

A questionnaire was prepared using Google form followed by link creation. Whatsapp numbers and email addresses of students using Smartphone were taken. Generated link was sent to them. They were requested to fill and submit the online form. Submission closed once desired sample size achieved. Data filled automatically in Google sheet linked with form. This sheet was downloaded as Excel file. Statistical analysis was done using Microsoft Excel 2016. Ethical approval was taken from the institution.

Variables: Students were asked about their personal profile and features of Smartphone using like brand, screen size, operating system. Next information about usage duration and usage pattern obtained. Finally, they were asked to report for any risky behavior and any health risk in relation to smartphone use. Variable for this section were obtained after thoroughly searching the literature. Responses for these variables were taken on 3-point ordinal scale i.e never/ sometimes/ often.

RESULTS

Out of 178 students, 105 (59%) were males and 73 (41%) females. 68% were hosteller and 32 % non-hosteller. Age range was 18-23 years. Smartphone usage duration was 835 hours' average per day about total sample.

Table 1 & 2, as depicted, Samsung was most common brand of used among medical students (30%). About screen size, 77% students were using screen size > 4 inches. 87% (Eighty-seven) were having android as their operating system (OS). Usage pattern of smartphone revealed (Table-4) that 69% often use for WhatsApp followed by listening song (46%), talking (44.4%), Facebook/twitter (44.4%) and watching online videos (31.5%).

Table 1: Smartphone Brand Used among Students (n=178)

Brand	Frequency (%)
Apple	12 (6.7)
HTC	11 (6.2)
Lenovo	12 (6.7)
Micromax	14 (7.9)
Nokia	14 (7.9)
Samsung	53 (29.8)
Motorola	21 (11.8)
Others	41 (23.0)

Table 2: Preferred Screen size among students (n=178)

Preferred Screen Size	Frequency (%)
4 inches	137 (77)
≤ 4 inches	36 (20)
No idea	5 (3)

Table 3: Average time spent per day using smartphone among students (n=170) *

Average time spent (hours)	Frequency (%)
0 - 2	42 (24.7)
2 - 4	64 (37.6)
4 - 6	35 (19.7)
6 - 8	16 (9.4)
Above 8	13 (7.6)

*Response provided by 170 students

Table 4: Usage pattern of smartphone among students (n=178)

Usage pattern	Never (%)	Sometimes (%)	Often (%)
Fb/ Twitter	28 (15.7)	71 (39.9)	79 (44.4)
WhatsApp	19 (10.7)	36 (20.2)	123 (69.1)
Watching online videos	27 (15.2)	95 (53.4)	56 (31.5)
Movies	64 (36.0)	78 (43.8)	36 (20.2)
Playing Games	59 (33.1)	68 (38.2)	51 (28.7)
Talking	23 (12.9)	76 (42.7)	79 (44.4)
Listening Songs	29 (16.3)	67 (37.6)	82 (46.1)

Table-5: Percentage distribution of risky behaviours across gender (n=178)

Risky behaviours	Male (n=105) often+Sometimes	Female (n=73) often+Sometimes	Test of Significance "Chi-square"
Using before going to sleep	89 (87.3%)	67 (95.7%)	$\chi^2=1.95$, p=0.16
Keep it near head while asleep	74 (71.8%)	56 (80%)	$\chi^2=0.85$, p=0.35
Using while on charge	74 (74%)	53 (76.8%)	$\chi^2=0.09$, p=0.75
Using on low battery (<10% level)	73 (74.5%)	50 (73.5%)	$\chi^2=0.02$, p=0.88
Using while walking on road	57 (57.6%)	43 (65.2%)	$\chi^2=0.37$, p=0.54
Using while crossing road	21 (22.3%)	12 (16.7%)	$\chi^2=0.36$, p=0.54
Using while driving	09 (9.4%)	04 (5.6%)	$\chi^2=0.61$, p=0.43
Using while traveling in public transport	73 (65.3%)	60 (85.7%)	$\chi^2=3.65$, p=0.05
Using while in dark	87 (86.1%)	61 (88.4%)	$\chi^2=0.02$, p=0.90

Table-6: Percentage distribution of health risks across gender (n=178)

Health risks	Male (n=105)	Female (n=73)	Test of Significance "Chi-square"
Headache	28 (29.2%)	42 (60%)	$\chi^2=17.2$, p=0.00
Irritation in Eye	30 (32.3%)	26 (38.2%)	$\chi^2=0.99$, p=0.31
Redness of Eye	24 (25.5%)	07 (10.8%)	$\chi^2=5.3$, p=0.02
Dryness of Eye	08 (8.7%)	13 (19.4%)	$\chi^2=4.3$, p=0.03
Blurring of vision	16 (17.4%)	09 (13.6%)	$\chi^2=0.30$, p=0.58
Neck pain	32 (33.3%)	24 (35.3%)	$\chi^2=0.12$, p=0.73
Back pain	26 (28%)	30 (45.5%)	$\chi^2=5.3$, p=0.02
Painful finger	17 (17.9%)	08 (12.3%)	$\chi^2=0.97$, p=0.32
Tingling in finger	15 (16.9%)	10 (14.9%)	$\chi^2=0.01$, p=0.91
Lack of sleep	35 (38%)	33 (47.8%)	$\chi^2=2.6$, p=0.10

An assessment of various risky behavior while using smartphone was done. It was tabulated across gender. Questions were asked on a 3-point scale, i.e Never/Sometimes/Often. For the ease of analysis, presence of risky behavior in any magnitude is being clubbed (Table-5). Using it before going to sleep was exceedingly high (Male vs female, 87.3% vs 96%). Similarly keeping smartphone near head while asleep (71.8% vs 80%), using it while its charging (74% vs 76.8%) and using it while its showing critical battery level (74.5% vs 73.5%). Risky behaviors in relation to road traffic accidents were assessed. More than half of students admitted using smartphone while walking near roads (57.6% vs 65.2%), while crossing road (22.3% vs 16.7%) or while on steering (9.4% vs 5.6%). None of these differences of proportion across gender found to be statistically significant. Using smartphone while commuting in public transport was much higher among female students (85.7%) vs male (65.3%), (p< 0.005).

Various health symptoms in relation to smartphone use were assessed among students. It was tabulated across gender (table-6). Students reported presence of various symptoms ranging from 8.7%- 38% in males and 10.2%-60% in females. These symptoms were related with headache, other pains, eye problems, and lack of sleep. Although present study reported a statistical significant difference (p <0.05) for headache, backache, redness of eye and dryness of eye, across gender, but smartphone use could not be labeled

as its sole cause. Further study will be needed to evaluate such relationship.

An analysis of risky behavior and health risks across residential status and median time interval was done. Using Smartphone while driving and lack of sleep was significantly higher among hosteller. While, keeping it near head, using while on charge, using while crossing road, headache, back pain and painful fingers were significantly high in those who were using it for > 4 hours per day. 18% respondents were aware of 20-20-20 rule while using any electronic devices.

DISCUSSION

Numbers of smartphone users are growing rapidly. In this scenario, any adverse health effect or event, even in small magnitude, can be a potential public health threat. Beside radiation exposure, smartphone is changing lifestyle patterns, especially among youth. It can be seen very easily at all public places as well as in family. The lifestyle pattern changes in relation to smartphone use have a very wide dimension. It can affect relationships, physical health, eating behaviour, sleep hygiene and many other health dimensions. Research is needed to cover all these issues.

Studies for adverse health effect of smartphone are mostly revolves around cancer. For other health effect, available evidences are inconclusive.³

Most common reason for using a mobile phone by student was for calling (51%), either family or

friends followed by texting (33.5%).⁴ Beside talking, texting is now become a central tool for communication among youth. The median number of texts among teen rose from 50 in 2009 to 60 in 2011.⁵

Although present study did not evaluate the addiction level for smartphone use among medical students but its reported a median duration of 4 hrs per day for smartphone use. It ranged from 1-18 hours. Also 44-70% of students were using it very often for different social networking sites. College students were reported using cell phone for 9 hours daily.⁶ Longer duration of smartphone use and using it mostly for social networking purpose were found to be associated with its addiction in an earlier study, where author reported 17% of young population addicted.² Using smartphone for gaming is frequent in 28.7% of students. Gaming was found to be associated with addiction in earlier studies.⁷ Smartphone gaming is generally combined with more than one applications such as social networking sites. These interactions promote addiction behaviour much faster compared to computer-based gaming.

Use of mobile phone while driving or while walking roadside or crossing roads now become a substantial risk factor in road traffic accidents. Texting while driving can cause distraction related-crashes. In Pew research survey, 20% teens admitted to texting while driving and in another survey on adults, 47% admitted doing the same.⁸

It is well said that 6-8 hours' sleep each night is essential for a healthy life style. Availability of smartphone to younger population without any restriction of its use may affect their lifestyle. Sleep quality deteriorates with increasing mobile use. 66% (Sixty-six) of students said they lose sleep due to late night usage of mobile.⁴ Using smartphone till late night is a risk factor for sleep disturbance which itself is a risk factor for depression.⁹ There is a positive correlation between smartphone addiction scale scores and sleep quality scores.¹⁰ A phone light interfere with the body natural rhythm. These lights inhibit melatonin and keep one awake for longer time.

Longer duration of smartphone use demands repetitive or prolonged neck flexion posture. This can lead to neck pain.¹¹ It can also inure tendon and muscle supporting the thumb, fingers and wrist. With time flexibility of digits may get compromised. Thumbs moves in a puzzling manner on smartphone. In heavy users, soreness of thumb as well as finger reported.¹² Present study found complaints of neck pain in almost 1/3rd of the respondents. This neck flexion could be more problematic using smartphone while commuting in public transport (65-85% doing this) and that too

on uneven road. Author reported a significantly higher head flexion angle while texting. It can be a major risk factor for neck pain in heavy text messenger.¹¹

Keeping cell phone next to their bed or even near head is very common, almost 44% as reported by Pew internet project.⁵ According to Offcon, eight out of 10 keeps mobile on overnight and around half use phone as alarm clock.¹³ Present study was in line with this trend, 7-8 out of ten students used to keep their smartphone near head. Experts recommend that the cell phone should be at least 3 feet away from the body during sleep.¹⁴

Almost 2/3rd of students were using their smartphone, even on critical battery level. The microwave radiation emitted by mobile phone is measured as specific absorption ratio-SAR. It is a rough guide how much radiation is being absorbed by the ear and brain. The national radiological protection board (NRPB) set the safe SAR at 2watts/kg. A call with critical battery level can expose a user to 100 times more radiation.¹⁵

A study on long term effect of cell phone on eye found blurring of vision, secretion and inflammation of eye, common among heavy users.^{16,17} Present study similarly reported irritation of eye, redness of eye, dryness of eye and dryness of vision being common among medical students, varying from 8-38%, although causal relationship could not be established.

Designed to reduce eye fatigue, the 20-20-20 rule says that every 20 minutes of screen time one should look away of something at least 20 feet away for at least 20 seconds. These regular screen break give once eyes some much needed rest and help prevent eye strain.¹⁸ When enquired about this rule from medical students, only 18% admitted awareness.

CONCLUSION

Smartphone use now became an addiction of different grades among medical students. They need to be sensitized about the health risk associated with its excessive use. This study gives an insight of health problems and risk behaviour associated with smartphone use. Medical students must maintain their sleep hygiene. They should have awareness of risk of electronic media use at night. This study had limitations, short duration of smartphone exposure and level of exposure was not assessed very meticulously. Future study should have focussed on various level of smartphone exposure.

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